The NASA **Langley Edge**

**NASA LANGLEY RESEARCH CENTER**

# Multiplexing Acoustic Emission Instrumentation

A Health Monitoring System for Structural Integrity Assessment

NASA Langley Research Center is actively seeking partnerships and collaborations to commercialize its Multiplexing Technology for Acoustic Emission Monitoring of Structures.

## The Market Opportunities

Applications of this technology include:

- Vibration analysis of acoustic emissions to determine likelihood of failure in pipelines
- Determination of forces on ship hulls to determine likelihood of failure
- Analysis of acoustic emissions to determine structural integrity of trains, airplanes, bridges, buildings, etc.

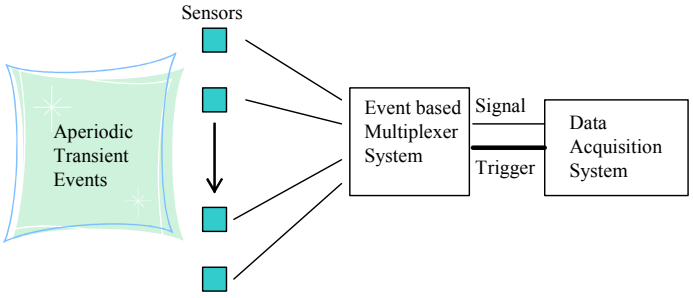
## The Benefits

- Multiplexing acoustic emission sensors overcomes cost, size, weight and power requirements of traditional acoustic emission monitoring hardware
- Acoustic emission based health monitoring using multiplexing significantly reduces costs and makes health monitoring of large structures more practical and reliable
- Significant cost reduction through elimination of data acquisition hardware

## The Technology

This invention provides a method for monitoring solid structures to detect, locate and assess damage to the structures. Acoustic emission (AE) sensors are multiplexed into data acquisition hardware by switching system sensors in response to AE signals.

The acoustic monitoring device monitors the




***Multiplexing system layout for capturing total transient events***

acoustic vibrations or signature of a solid structure in response to set criteria, or a predetermined triggering event which activates a recording of possible alteration and/or damage to the solid structure. The triggering event comprises an acoustic signal of a predetermined amplitude. Once the acoustic triggering event occurs at a sensor location, the acoustic monitoring device records the acoustic event at other sensor locations. By recording the acoustic event that caused the triggering of an acoustic monitoring device, the detected acoustic event reveals its origin, and the magnitude of the event becomes assessable. By multiplexing the sensors to record the acoustic activity after occurrence of a triggering event, a continuous monitoring of a solid medium occurs while conserving resources. This permits large area coverage.

## Additional Information

*To discuss in detail how this technology can profit you and your business, please contact:*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